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OPERATIONAL DIAL-A-RIDE DISPATCHING PROGRAM: INSTRUCTIONS FOR USING THE SYSTEM TAPE.

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OPERATING HANDBOOK

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    This handbook contains notes and instructions on using the magnetic tapes that contain the Operational Dial-A-Ride computer dispatching program that was produced by MIT Urban Systems Laboratory under Grant Mass MTD-6, for the Department of Transportation Urban Mass Transit Administration.

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CONTENTS OF SYSTEM TAPE

GENERAL FORMAT OF THE TAPE

The system tape is a nine-track tape, written at 800 bits
per inch in the Extended Binary Coded Decimal Interchange code.
The tape is written with odd parity in NRZ1 mode. Records are
unblocked 80- character records. There are no tape labels.
There is a tape mark at the end of each file, and two tape
marks at the beginning of the tape. There are eight files.

FILE #1: RELOCATABLE LIBRARY

The first file contains reloctable object modules of the
dial-a-ride program. These modules can be cataloged on the
DOS system library by using the following job stream:

                    // JOB CATALOG

                    //   ASSGN SYSIPT, X'nn'

                    //   EXEC MAINT

                   /&

Where nnn is a tape drive on which the system tape has
been mounted and readied at load point.

FILE #2: SOURCE DECKS

The second file contains source code decks for all modules
specified in the link edit map for the acceptance test, and for
the subroutines listed in the user's manual. The file com-
prises a DOS job stream which will compile all the FORTRAN
modules in alphabetical order, then all the assembly language
modules in alphabetical order.

The names are as follows:

                    <u>FORTRAN Language Modules</u>

                         ANOMRT

                         ABLOCK   (block data)

                         ARRIVE

FORTRAN Language Modules (Cont.)

ASSIGN

BREAK

CHTIM

CONS

CTIME

CUTPAS

DAMASS

DELAY

DEMAND

DEPART

DIRECT

CLCHCK

DPLINE

DSHIST

DSTOUR

EXPNTL

FINISH

FIXTIM

FPLINE

FPPNT

FSDATL

FORTRAN Language Modules (Cont.)

FSTPOS

HOLDV

IACCT

IDISP

IDV

INITL

INTIO

INTOUR

IREC

LOCATE

MAINPGM

MAIN2

MODEL

MOVE

NEW

NOPLAC

OBJECT

OBJINT

OTEST

OUTOUR

OVRDUE

FORTRAN Language Modules (Cont.)

PARMS   (block data)

PASPLT

PASS1

PLINE

PPNT

PREDTM

PSEUDO

PSTATS

PTEXT

QUIET

READ

REPAIR

RESCHD

RESTOR

RETRKT

RETRN

SETUP

SGDSLL

SPDCHG

STDUMP

STLOAD

STPOS

FORTRAN Language Modules (Cont.)

SYSDN

SYSTAT

TIMDAY

TMGDS

TRANS

TRSINT

VDUMP

VLOAD

VSTATS

WARMST

WIPE

WRITE

ASSEMBLY Language Modules

ADRESI

ATTACH

BINEBC

CRSCOM

IJLO8Y22 (modified to provide for
          BTAM support of IBM 2741
          type terminals)

CONOUT

CPTYME

DTFBTS

EBCBIN

5

IHASH

ITIME

MSGS

PHI

MIRROR

TREVOR

WAITRD

DUMMY

FILE #3:   ADDC

File #3 contains the first of the two automatic billing routines, ADDC, in source language form (including compiling J.C.L.) The modules are:

ADDC

PERUSE

RETRV

IACCT

REPEAT

SCRAWL

EBCBIN   (not included here, can be
             obtained from file 2 or 4)

DIGITS

NDATE

FILE #4:   CONTROL

File #4 contains the second of the two automatic billing

routines, CONTROL, in source language form (including com-
piling J.C.L.). The modules are:

CONTROL

RETRV

IACCT

REPEAT

SCRAWL

DIGITS

NDATE

EBCBIN

IREC   (not included here; can be
         obtained from file 2)

FILE #5:   STANDING REQUEST PROGRAM

    The fifth file contains the standing request program (in-
cluding compiling J.C.L.). The modules are:

SR

CONOUT

TRSINT

PARMS (block data)

BINEBC

ADRES1

IHASH

FILE #6:   STATISTICS PROGRAM

    The sixth file contains the Statistics Program. The
statistics program processes the transaction cards punched by
CARDOS. Trip information and summary statistics are output.

FILE #7: MORSUPR

    File #7 contains MORSUPR, a DOS job stream which catalogs
a calling module into the relocatable library consisting of
PHASE and INCLUDE cards. It can be used to link edit CARDOS in-
to the core image library by means of the following job stream:

```
              //   JOB LINK

              //   OPTION CATAL

                   INCLUDE MORSUPR

              //   EXEC LNKEDT

              /*

              /&
```


FILE #8: DSTEVE   (ATC FILE CREATION PROGRAM)

    File #8 contains DSTEVE, a fortran program to build the
address to coordinate translation files (no compiling J.C.L. is
provided in the file).

INSTRUCTIONS FOR USE

COMPILATION

  The second file on the tape is a DOS job stream which will compile all the modules and produce relocatable binary decks suitable for cataloging on the user's system. The relocatable modules if using the MORSUPR deck must be cataloged under the following names:

Module Name	CATALR Name
ADRES1	MORADRES
ABLOCK	MORABLCK
ANOMRT	MORANOMR
ARRIVE	MORARRIV
ASSIGN	MORASSIG
ATTACH	MORATTAC
BINEBC	IJUBINEB
BREAK	MORBREAK
CHTIM	IJUCHTIM
CONOUT	MORCONOU
CONS	IJUCONS
CRSCOM	MORCRSCO
CPTIME	CPTYME
CTIME	MORCTIME
CUTPAS	MORCUTPA
DAMASS	IJUDAMA
DELAY	MORDELAY

DEMAND	MORDEMAN
DEPART	MORDEPAR
DIRECT	MORDIREC
DLCHCK	IJUDLCHC
DPLINE	IJUDPLINE
DSHIST	IJUDSHIS
DSTOUR	IJUDSTOU
DTFBTS	MORDTFBT
DUMMY	DUMMY
EBCBIN	IJUEBCBI
FINISH	IJUFINIS
FIXTIM	MORFIXTI
FPLINE	IJUFPLIN
FPPNT	IJUFPPNT
FSDATL	IJUFSDAT
FSTPOS	IJUFSTPO
HOLDV	MORHOLDV
IACCT	MORIACCT
IDISP	MORIDISP
IDV	MORIDV
IHASH	MORIHASH

INITL	MORINITL
INTIO	IJUINTIO
INTOUR	IJUINTOU
IREC	MORIREC
ITIME	MORITIME
LOCATE	MORLOCAT
MAINPGM	MORMAIN
MAIN2	MORMAIN2
MIRROR	MORMIRRO
MODEL	MORMODEL
MOVE	IJUMOVE
MSGS	MORMSGS
NEW	IJUNEW
NOPLAC	MORNOPLA
OBJECT	IJUOBJEC
OBJINT	IJUOBJIN
OTEST	IJUOTEST
OUTOUR	IJUOUTOU
OVDUE	MOROVRDU
PARMS	MORPARMS
PASPLT	IJUPASPL
PASS1	IJUPASS1

PHI	MORPHI
PLINE	IJUPLINE
PPNT	IJUPPNT
PSEUDO	MORPSEUD
PSTATS	IJUSTAT
PTEXT	IJUPTEXT
QUIET	MORQUIET
READ	MORREAD
REPAIR	MORREPAI
RESCHD	MORRESCH
RESTOR	MORRESTO
RETRKT	MORRETRK
RTRN	IJURTN
SETUP	IJUSETUP
SGDSLL	IJUSGDSL
SPDCHG	MORSPDCH
STDUMP	MORSTDUM
STLOAD	MORSTLOA
STPOS	IJUSTPOS
SYSDN	MORSYSDN
SYSTAT	MORSYSTA
TIMDAY	MORTIMDA

TMGDS	IJUTMGDS
TRANS	MORTRANS
TREVOR	MORTREVO
TRSINT	MORDSTUF
TUFACE	MORTUFAC
VDUMP	MORVDUMP
VLOAD	MORVLOAD
VSTATS	IJUVSTAT
WAITRD	MORWAITR
WARMST	MORWARMS
WIPE	IJUWIPE
WRITE	MORWRITE

OPERATING PROCEDURES

Program documentation and the User's Manual are deficient in description of initialization procedures and system requirements.

The following is a partial list of requirements and procedures to run CARDOS under D.O.S.:

System Configuration: Figure 1 contains the minimum 360/50 hardware configuration to run CARDOS. Most commercial installations will exceed this minimum configuration. The main requirements are for a 360/40 or better and 256K of core storage.

Initialization Procedures: In order to run CARDOS, a city grid is required. Therefore, a disk area must be cleared (approximately five cylinders; two for the primary grid file, two for the secondary grid file and one for the duplication file). The streets must be coded according to the format contained in Figure 2 (see page 62 of the User's Manual). These cards are input into the ATC file creation program (tape file eight contains the ATC file creation program) which will build the address to coordinate transition files on disk. In order that restart may be performed in the case of computer failure, two dumping files

(approximately three cylinders each) must be provided for
on disk.

If standing requests are to be handled, the pre-processor
program SR (see standing request documentation) must be
run and the the card output placed at the end of the input
file.

Program Loading: CARDOS can be loaded from source or
from the relocatable object modules.

>   1.   Using tape file two, containing the source, the
>   compilations and assemblies will be performed
>   by assigning sysipt to the tape drive. The
>   object decks must then be catalogued into the
>   relocatable library.

>   2.   Using tape file one, containing the source, the
>   modules the job stream contained in the descrip-
>   tion for file one will catalog the modules into
>   the relocatable library.

To use the calling module contained on tape file seven re-
quires the object decks, obtained from using file two, to
be catalogued according to the scheme outlined in the
section Instructions for Use Section 1. Using tape file
one, the modules will automatically be catalogued into the
R.L. according to that scheme including the calling module.

To run CARDOS on a 256K byte machine with multitasking
under DOS requires overlaying of core. This structure is
detailed in Section 9, Subroutine List, of the User's
Manual.

Once the program has been link edited and catalogued into
the core image library using the calling module, file
seven, CARDOS can be executed by using an input deck simi-
lar to the sample input file contained in Figure 3. (Notes
033, 034 have been assigned to teletype ports, and 032,
031, and 02F have been assigned to 2741 ports). The disk
is attached as 130. The DLBL and EXTENT cards may require
modification to reflect the placement of the dumping files
at a different location on the disk. The initial bus
locations are for a Cambridge Street network and the ASSGN
DLBL, and EXTENT cards for the address to coordinate trans-
lation files are missing from the job stream as they have
been made the standard assignments.

FIGURE 1

REQUIREMENTS FOR A SYSTEM 360/50 FOR THE DAR PROGRAM

MODEL	FEATURE #	DESCRIPTION
2050	I	CPU 524K Bytes Decimal Arithmetic Fltg Pt. Arithmetic Multiple XOR Channel Storage Protection
	6980	1st Selector Channel
	6981	2nd Selector Channel
	7920	1052 Adapter
1052	007	Printer Keyboard
2821	001	Unit Record Control Unit
	3615	1100 RPM Printer Adapter
	8637	USC Adapter
2540	001	Card Read/Punch
1403	N1	Speed Printer
	8640	Universal Character Set
2803	001	Tape Control Unit
2401	002	Tape Drives 90 KB
2314	A1	Storage Control
2313	A1	Disk Storage (4 drives each)
2702	001	Teleprocessing Control Units
	3233	Data Set Line Adapter
	4615	Terminal Control Type I
	7912	Telegraph Control Type II

FIGURE 2

STREET DIRECTORY CONSTRUCTION*

The address to coordinate translation procedure chosen for the Dial-a-Ride programs is designed to 1)locate street address in internal coordinates used by the assignment algorithm and 2) locate place names in the same fashion. This section describes the format in which the data is expected by the program which builds the street directory file.

For each street segment (a block face from one intersection to the next) determine 1) the lowest and highest numbers on that face, and 2) the coordinates of the midpoint of the block face. With this information data cards can now be punched, one data card per block face. Starting at column 1, punch the name of the street (only the first eighteen (18) characters of the name will be read), followed by, in column nineteen the street type (e.g. 'st', 'te', 'rd', 'pl', 'sq', etc.). Then punch the internal coordinates associated with that block face in columns 31-35 and 36-40 (also right-adjusted).

In the case of place names (which by definition do not have street numbers) the low and high numbers should be 'O' and '999' respectively. The street type entry should be the first two characters of the place name while the street name entry as described above is the rest of the name.

These data cards should then be sorted with major field being the street name, minor field being street type. These are then processed using the ATC file creating program, which will construct the address to coordinate disk file.

*obtained from page 16 of "Cars Advanced Program Implementation and Users Guide".

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FIGURE 3

SAMPLE INPUT DECK

```
printf sik@x sysin

// JOB RUN THE CARS SYSTEM
// ASSGN SYS002,X'00C'
// ASSGN SYS005,X'00E'
// ASSGN SYS006,X'130'
// ASSGN SYS007,X'130'
// ASSGN SYS008,X'130'
// ASSGN SYS003,X'130'
// ASSGN SYS004,X'130'
// DLBL IJSYS03,'CARS DUMPING FILE1',99/365
// EXTENT SYS003,234079,1,,3820,60
// DLBL IJSYS04,'CARS DUMPING FILE2',99/365
// EXTENT SYS004,234079,1,,3880,60
// ASSGN SYS010,X'033'
// ASSGN SYS011,X'034'
// ASSGN SYS012,X'032'
// ASSGN SYS013,X'031'
// ASSGN SYS014,X'02F'
// ASSGN SYS024,X'0FF'
// PAUSE BEFORE RUNNING THE SYSTEM
// EXEC SUPR000
COLD
DATA STARTS HERE
01.        5  00.0
   20    20    20    20    20    20
ACCEPTANCE TEST INPUT FILE SIX
 2 3      7  000 1 1 0
 0         6 10  4.0 .019  0. 999.  00.0
 0.50 1.20  4.0   4.1  1.0
 3 0.4 0.3 0.3
 15.  1.5    5.   1.5    5.
 10.  1.3    3.   1.3    3.
  5.  1.3    5.   1.3  10.
  0.0  0.0  25  0.0
 1 1 1   0.   0.    15.
 0 0 1 1  2.
MIT
12 CENTRAL SQ
KENDALL SQ
B.U. BRIDGE
14 PLYMPTON ST
344 RIVER ST
/*
/&
```